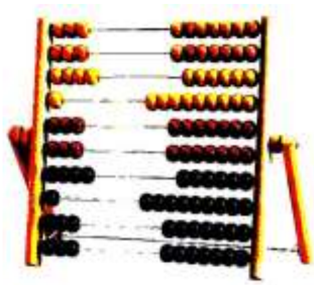


First **Count** later Add

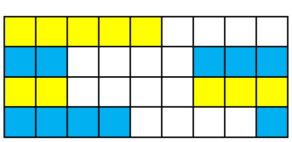
MatheMatics as **Many**Matics

a Natural Science about **MANY**

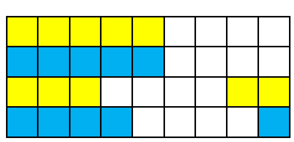
MATH**e**CADEMY.net: Prevent DysCalCulia by using Children's own 2D Numbers with Units

Count In *Icons* In *BundleCups*	 T = I I I I = ⅃ = 4 T = I I I I I I I = III III I = II) I = 2)1 **3s** = 2.1 **3s** = 2 1/3 **3s**
ReCount In same Unit In new Unit	DeBundle & EmBundle to create Overload & Deficit T = I I I I I I I = 2)1 = 1)4 = 3)-2 **3s** T = 2)1 **3s** = 1)3 **4s** = 1)2 **5s** = 3)1 **2s** = 1)1)1 **2s**
ReCount In Tens From Tens	 T = 3 **7s** = ? **tens** Answer: T = 3x7 = 21 = 2.1 **tens** T = 47 = ? **6s** Answer: T = 47/6 x 6 = 7 **6s** & 2
DoubleCount in *PerNumbers* in *PerFive, 3/5* in *PerHundred, %*	 With 4$ per 5kg, T = 20kg = (20/5) x 5kg = (20/5) x 4$ = 16$ 3 per 5 of 200$ = ?$. 200$ = (200/5) x 5$ gives (200/5) x 3$ = 120$ 70% of 300$ = ?$. 300$ = (300/100) x 100$ gives (300/100) x 70$ = 210$
Calculator Prediction *RecountFormula*	 T = 2 **4s** = ? **5s** = 1.3 **5s** since — 2x4/5 → 1.some; 2x4 – 1x5 → 3 T = (T/B) x B i.e. T = T/B **Bs**
Add OnTop NextTo	 T = 2 **3s** + 4 **5s** = 1.1 **5s** + 4 **5s** = 5.1 **5s** T = 2 **3s** + 4 **5s** = 3.2 **8s**
Multiply, Divide Use *CupWriting*	**7 x** 463 = **7 x** 4)6)3 = 28)42)21 = 28)44)1 = 32)4)1 = 3241 3241 **/7** = 32)4)1 **/7** = 28)44)1 **/7** = 28)42)21 **/7** = 4)6)3 = 463

T = 7 = 2.1 **3s** on an Abacus:



Geometry-mode



Algebra-mode

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MATH**e**CADEMY.net Teaching – not **ESSENCE** but **EXISTENCE**	Teaching Teachers to Teach MatheMatics as **Many**Matics

C1 *Many is counted in stacks using the recount-prediction: T = (T/b)*b*

Many occurs as extension in space and time:
Put the finger on the pulse, and add a stroke for each beat, Many in time is then transferred to Many in space through an iconization.
The strokes can be arranged in different ways:
1. Next to each other: | | | | | | |
2. Connected in a number-icon (4 strokes in 4)
3. Bundled and stacked: | | | | | | -> ||| ||| -> 2 3s = 2*3

Many can be re-stacked or re-counted by changing the bundle-size: T = 3 7s = 3*7 = ?*4 = ? 4s

We count in 4s by taking away 4s. The process ‘taking away 4s’ may be iconized as ‘/4’ and worded as ‘counted or divided in 4s’. So the **recount-formula** says **T = (T/4)*4**. T/4 is the counter, 4 the unit.

The answer can be counted, or predicted by calculating:
T=3 7s=3*7=(3*7/4)*4=5*4 + 1=5*4 + ¼*4=(5 ¼)*4

Multiplication is a standard rebundling in tens and 1s:
T = 3*6 = 3 6s or T = 3*6 = 18 = 1*10 + 8*1.

Rebundling in tens leads to decimals and percentages:
T = 3 6s = 3*6 = (3*6/10)*10 = (1 8/10)*10 = 1.8*10
T = 3 6s = 3*6 = 18 = (18/100)*100 = 18%*100

Sugar can be bundled in kilos, litres, dollars and %.
A rebundling can change the bundle type:
2 kg = 5 $ = 6 litres = 100 %, T = 7 kg = ?
T = 7 kg = (7/2)*2kg = (7/2)*5 $ = 17.50 $
T = 7 kg = (7/2)*2kg = (7/2)*6 litres = 21 litres
T = 7 kg = (7/2)*2kg = (7/2)*100 % = 350 %
P = 5% = (5/100)*100% = (5/100)*2 kg = 0.1 kg

Also bundles can be bundled and stacked in bundles-of-bundles, bundles & unbundled:
T=234=2 bundles-of-bundles+3 bundles+4 unbundled.

In short a given degree of Many can always be rearranged as a multiple stack (a polynomial):
T = 2345 = 2+3+4+5 = 2*B^3 + 3*B^2 + 4*B + 5*1.

T = 2 8s. The ‘ten-bundler’ counts ‘bundle + 6’ i.e. 16, and the ‘twelve-bundler’ counts ‘bundle + 4’ i.e. 14.

So T = $(16)_{10} = (14)_{12}$.

A1 *Adding stacks gives overloads removed by the restack-prediction T = (T-b)+b*

T = 38+29 = 3ten8 + 2ten9 = 5ten17 = ?

An overload can be restacked and rebundled. First it is restacked by taking away 10 1s: T = 17 = (17-10)+10 = 7+10. Then the 10 1s is rebundled to 1 10s and added to the 10s as in book-keeping:
T = 38+29 = 3t8+2t9 = 5t17 = (5+1)t(17-10) = 6t7= 67
T = 38+29=3ten8+2ten9=5ten17=5ten1ten7 =6ten7=67
The process ‘take away 4’ is iconized as ‘-4’ , ‘minus 4’. So the **restack-formula** says **T = (T-b)+b**. The answer can be counted, or predicted by calculating.
Repeating adding stacks might lead to a big overload:
T=4*18 = 4*(1ten8) = 4ten32 =4ten3ten2 = 7ten2 = 72

T1 *A calculation can be analysed & reversed:* x*3+2=14 -> (x*3)+2=14 -> x=(14-2)/3

A forward calculation 4*3 = ? can be reversed to a backward calculation (equation) ?*3 = 12 or x*3 = 12

Also the repeated calculations 4*3+2 can be reversed:

		*3		+2	
forward:	x	——>	x*3	——>	(x*3)+2
back:	4	<——	12	<——	14
		/3		*-2*	

Forward and backward calculation may be walked along the floor, or arranged in columns in a 2x2 calculation-table as the move&change-method: Change the calculation-sign when moving to the other side.

a = ?	T	= b + (a*n)	
T = 80	T-b	= a*n	
b = 20	(T-b)/n	= a	
n = 5	(80-20)/5	= a = 12	
Test:	*80*	*= 20+12*5*	*= 80* ☺

S1 *Stacks in space can be reshaped, or made round a*b=(a*b/c)*c =√(a*b)^2; a=a/b*b=tanA*b*

An area can be divided, first in polygons, then in triangles and finally in right triangles, half-stacks. An a*b stack has area a*b. Its diagonal c can be found by reversing Pythagoras a^2+b^2=c^2. Its angle A can be found by reversing tanA= a/b, recounting a in b’s.

A square with the diameter d has a circumference c= d*4*sin(180/4). A circle with the diameter d has a circumference c= d*n*sin(180/n)= d*π, where n-> ∞.

MANY-based PYRAMIDeDUCATION

To deal with MANY, we Count & Add in Time & Space.
As their common subject, MANY is the root of
2x4 CATS tales: Count & Add in Time & Space

Self-referring MatheMatics places the authority in the LIBrary where concepts are defined & statements proved. Natural ManyMatics places the authority in the LABoratory, where mathematics arises from 2x4 Counting and Adding tasks in Time and Space. In this way the learner is educated, not by books, but by the physical fact Many.

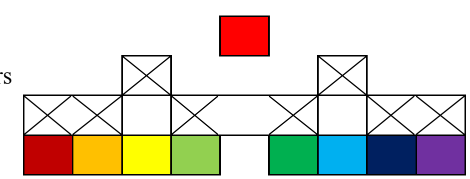
Primary school mathematics is learned through educational sentence-free meetings with the sentence subject developing tacit competences and individual sentences coming from abstractions and validations in the laboratory, i.e. through automatic ‘grasp-to-grasp’ learning.

Secondary school mathematics is learned through educational sentence-loaded tales abstracted from and validated in the laboratory, i.e. through automatic ‘gossip-learning’: Thank you for telling me something I don’t know about something I know.

In PYRAMIDeDUCATION 8 teachers form 2 teams choosing 3 pairs and 2 instructors by turn. Instructing the rest of their team the instructors consult the coach. Each pair works together to solve Count&Add assignments and routine problems; and to carry out an educational task to be reported in an essay rich on observations of examples of cognition, both re-cognition and new cognition, i.e. both assimilation and accommodation.

The coach assists the instructors in correcting the Count& Add assignments. In each pair each teacher corrects the other teacher’s routine-assignment. Each pair is the opponent on the essay of another pair. Each teacher pays for the education by coaching a new group of 8 teachers.

1 coach
2 instructors
3 pairs
2 teams



8 teachers and 1 coach